ANPRDI 26 (1–12) 1–444 (1989)
ISSN 0144–557X

Analytical Proceedings

Proceedings of the Analytical Division of
The Royal Society of Chemistry

Volume 26 1989

Published by
THE ROYAL SOCIETY OF CHEMISTRY
THOMAS GRAHAM HOUSE, SCIENCE PARK,
MILTON ROAD, CAMBRIDGE CB4 4WF

Analytical Proceedings

Proceedings of the Analytical Division of The Royal Society of Chemistry

Officers of the Analytical Division of The Royal Society of Chemistry

President
D. Thorburn Burns

Hon. Secretary
J. D. R. Thomas

Hon. Assistant Secretary
R. Sawyer

Hon. Publicity Secretary
J. D. Green

Hon. Treasurer
T. B. Pierce

Secretary
Miss P. E. Hutchinson

Editor, Analytical Proceedings
R. A. Young

Editorial Manager
J. Egan

Assistant Editors
P. A. Delaney, M. A. Mackenzie

ANALYTICAL EDITORIAL BOARD

Chairman
J. D. R. Thomas

J. F. Alder
D. Betteridge
N. T. Crosby
L. C. Ebdon
*J. Egan
*H. M. Frey
D. L. Miles
J. N. Miller
R. M. Smith

**Ex officio* members

© The Royal Society of Chemistry 1989. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form, or by any means, electronic, mechanical, photographic, recording, or otherwise, without the prior permission of the publishers.

ROYAL SOCIETY OF CHEMISTRY

100 MODERN REAGENTS

Consulting Editor: Dr N.S. Simpkins, *University of Nottingham*

Description and Contents:

The challenge of carrying out highly selective chemical transformations on ever more complex molecules, has resulted in the development of a vast armoury of organic reagents. This book brings together a selection of 100 reagents which have found significant application in organic synthesis.

100 Modern Reagents features less familiar reagents which have been identified in 'Methods in Organic Synthesis' during the last five years. The selection reflects reagents which have found widespread use, with emphasis on those which allow important transformations or which show interesting and varied reactivity.

The book provides current, up-to-date information and includes the following data on each reagent listed:

★ name ★ structure ★ molecular formula ★ molecular weight ★physical properties ★ preparation and modifications ★ price range ★ safety precautions needed

The reagents are arranged in alphabetical order and cover two pages each, with the second page providing three reaction schemes highlighting the uses of the reagent.

ISBN 0 85186 893 2 **October 1989** **A5** **Flexicover, approx 210 pages** **Price £19.95**

ROYAL SOCIETY OF CHEMISTRY
Information Services

For further information, please write to:
Royal Society of Chemistry,
Sales and Promotion department,
Thomas Graham House,
Science Park,
Milton Road,
Cambridge CB4 4WF. U.K.

To Order; please write to:
Royal Society of Chemistry, Distribution Centre, Blackhorse Road, Letchworth, Herts SG6 1HN. U.K.
or telephone (0462) 672555 quoting your credit card details.
We can now accept Access/Visa/MasterCard/Eurocard.

RSC Members should order from:
The Membership Manager,
Royal Society of Chemistry,
Thomas Graham House,
Science Park, Milton Road,
Cambridge CB4 4WF. U.K.

NAME INDEX

A

Adeeyinwo, C. E., and **Tyson, J. F.** On-line precipitation in flow injection atomic absorption spectrometry, 375.
—— and ——. Reduction of interference effects in flame atomic absorption spectometry using flow injection techniques, 58.
Aggett, J. Obituary, 75, 150.
Akapo, S. O., Furst, A., Khong, T. M., and **Simpson, C. F.** Effect of carbon load on the chromatographic performance of n-octylsilyl reversed phases in liquid chromatography, 61.
—— and **Simpson, C. F.** Influence of mobile phase additives on the retention behaviour of polar solutes on oligomeric n-octylsilyl reversed phases, 394.
Alabbas, S. H., Ashworth, D. C., and **Narayanaswamy, R.** Design and performance features of an optical-fibre reflectance pH sensor, 373.
Alder, J. F. *See* Rezgui, N.
Almuiabed, A. M., and Townshend, A. Enzymatic amplification reactions: flow injection determination of NAD^+ with immobilised alcohol dehydrogenase and malate dehydrogenase, 56.
Ambrose, A. J., Ebdon, L., and **Jones, P.** Novel preconcentration technique for the determination of trace elements in fine chemicals, 377.
Anderson, R. M. *See* Kneller, P. E.
Andrews, A. R. J., and **Townshend, A.** Chemiluminescence detection of a benzodiazepine, 368.
Angelikaki, C., and **Usher, M.** An intelligent sample changer. (Analytical Viewpoint), 424.
Archer, G. Voluntary Service Overseas, 423.
Ashworth, D. C. *See* Alabbas, S. H.
Aylott, R. I., and **Walker, D. A.** Determination of ethyl carbamate in alcoholic beverages, 431.

B

Baiulescu, G. E., and **Thomas, J. D. R.** Concepts in analytical chemistry, 281.
Bancroft, K. C. C. *See* Branch, S.
Bark, L. S. New Member of Council, 418.
—— Report of Meeting on Training of Analytical Chemists for Developing Countries, 249.
Barretto, F. F., and **Slater, J. M.** Flow injection analysis of phospholipids, 64.
Beh, S. K., Moody, G. J., and **Thomas, J. D. R.** Modified simplex optimisation for operating an enzyme electrode, 290.
Benson, R. L., Worsfold, P. J., and **Sweeting, F. W.** Spectrophotometric flow-injection techniques for process monitoring, 385.
Bergin, F. J., and **Shurvell, H. F.** Applications and limitations of Fourier transform Raman spectroscopy, 263.
Beswick, C. W., Moody, G. J., and **Thomas, J. D. R.** Lithium ion-selective electrodes: optimisation studies for blood serum analysis, 2.
Betteridge, D. Appointed 1990/1 Schools Lecturer, 250.
Black, S. A., and **Matthews, G. P.** Colorimetric and gas chromatographic determination of total fluoride in toothpastes containing ionic and covalent fluoride, 67.
Black, Sir James. Award of 1988 Nobel Prize for Medicine, 78.
Bond, A. M. Award to member of Analyst Advisory Editorial Board, 439.
—— New strategies for determining trace metals in industrial materials and effluents, 289.
Bos, A. *See* van der Linden, W. E.
Bos, M. *See* van der Linden, W. E.
Bradley, N., and **Morgan, E. D.** Sampling and analysis of organic vapours in the flue gases from pottery kilns, 6.
Branch, S., Bancroft, K. C. C., Ebdon, L., and **O'Neill, P.** The determination of arsenic species by coupled high-performance liquid chromatography - atomic spectrometry, 73.
——, **Ebdon, L., Hill, S.,** and **O'Neill, P.** Liquid chromatography - inductively coupled plasma - mass spectrometry for monitoring tributyltin in waters, 401.
Braun, T., Schubert, A., and **Zsindely, S.** The decline of British analytical chemistry: fact or artefact? (Analytical Viewpoint), 87.
Brearley, T. H., Doshi, A. K., and **Fielden, P. R.** Safety in numbers: detection with voltammetric arrays, 389.
Brennan, M. C., and **Svehla, G.** Voltammetric methods in the analysis of anaerobic sealants, 343.
Brereton, R. G. Fourier transforms in spectroscopy—a chemometric approach, 311.
Buckley, E., Smyth, M. R., Heineman, W. R., and **Halsall, H. B.** Some recent developments in electrochemical immunoassays, 5.
Burford, M. D., and **Smith, R. M.** Chemotaxonomic identification of *Tanacetum parthenium* L. (Feverfew), 339.
Burr, C. M., and **Smith, R. M.** Retention prediction in RP-HPLC using a functional group database and expert system (CRIPES), 24.
Burton, K. Simplex optimisation, 285.

C

Campbell, A. T., and **Howard, A. G.** A semi-continuous flow method for the trace analysis of dissolved inorganic antimony, 32.
Chandler, G. K., Dodgson, J. R., and **Eddowes, M. J.** ISFET-based enzyme sensors for urea: enzyme-modified and column-immobilised enzyme flow injection analysis, 154.
Chimpalee, D. *See* Thorburn Burns, D.
Chimpalee, N., Harriott, M., and **Thorburn Burns, D.** Improvement in the determination of bismuth by flame atomic absorption spectrometry using a new design of slotted tube atom trap, 258.
—— *See* Thorburn Burns, D.
Clark, B. J. *See* Mama, J. E.
Clayton, P., and **Davis, B.** Strategies for sampling ambient air for pollutants of industrial and environmental interest, 284.
Comber, S. D. W., and **Howard, A. G.** Arsenic speciation by hydride generation atomic absorption spectrometry and its applications to the study of biolgical cycling in the coastal environment, 20.
Cooke, M. *See* Smith, C. L.
Coomber, D. A. New Member of Council, 418.
Cresser, M. S. Appointed to personal Chair in Soil Science at the University of Aberdeen, 361.
Crosby, N. T. New Member of Council, 85.

D

Dadgar, D. *See* Kelly, M. T.
Dalziel, J. A. W. Appointed L. S. Theobald Lecturer, 250.
Darke, S. A., Long, S. E., Pickford, C. J., and **Tyson, J. F.** Laser ablation system for solid sample introduction into the inductively coupled plasma, 159.
——, **Pickford, C. J.,** and **Tyson, J. F.** Study of electrochemical vaporisation sample introduction for plasma spectrometry, 379.

Davies, D. M., and **Deary, M. E.** Iodimetric method for measuring low concentrations of diacetyl peroxide, using hydrogen peroxide as a catalyst, 366.
Davis, B. *See* Clayton, P.
Davison, G. Justify a LIMS system, 102.
Deary, M. E. *See* Davies, D. M.
de Pablos, F. *See* Martin-Landa, I.
Diamond, D. *See* Telting-Diaz, M.
Dicken, T. W., and **Rendell, D. A. E.** Determination of oil additives by infrared spectroscopy, 405.
Dodgson, J. R. *See* Chandler, G. K.
Dominguez, P., Tuñon, P., Fernandez, J. M., and **Smyth, M. R.** Sensors based on amperometric enzyme electrodes, 387.
Donaghy, C., Harriott, M., and **Thorburn Burns, D.** Use of surface coatings in the determination of bis(tributyltin) oxide in freshwater by using graphite furnace atomic absorption spectrometry, 260.
Donlan, A. M., Moody, G. J., and **Thomas, J. D. R.** The amperometric detection of some enzyme inhibitors, 369.
Doshi, A. K. *See* Brearley, T. H.
Doyle, E., McDowall, R. D., Murkitt, G. S., Picot, V. S., and **Rogers, S. J.** Automated sample handling for drug analysis from biological fluids using HPLC, 294.
Drake, A. F., Fung, M. A., and **Simpson, C. F.** Protein conformational changes as the result of binding to reversed phase chromatography column materials, 49.
—— *See* Fung, M. A.
Durrani, T. M. *See* Greenfield, S.
Dyas, A. M., Robinson, M. L., and **Fell, A. F.** New approaches to chiral resolution of drug enantiomers and related compounds by HPLC, 346.

E

Ebdon, L. New Deputy Director of Polytechnic South West, 299.
—— *See* Ambrose, A. J.
—— *See* Branch, S.
Eddowes, M. J. Immunosensors based upon direct measurement of surface binding: fundamental chemical limitations, 152.
—— *See* Chandler, G. K.
Elmosalamy, M. A. F., Moody, G. J., Thomas, J. D. R., Kohnke, F. A., and **Stoddart, J. F.** Studies on two epoxyoctacosahydro[12]cyclacene derivatives as sensor coatings on quartz piezoelectric crystals for detecting aromatic vapours, 12.

F

Fairbrother, P., George, W. O., and **Williams, J. M.** Fermentation of cheese whey—monitoring by FT - IR, 264.
Fell, A. F. Royal Society of Chemistry Awards 1988—Chromatography and Separation Chemistry, 250, 305.
—— *See* Dyas, A. M.
—— *See* Mama, J. E.
Fernandez, J. M. *See* Dominguez, P.
Fielden, P. R. *See* Brearley, T. H.
—— *See* Jiang, M.
—— *See* Packham, A. J.
Flint, C. D. *See* Odlyha, M.
Fogg, A. G. *See* Moreira, J. C.
—— *See* Wang, X.
—— *See* Zhao, R.
Forbes, G. I. Microbial contamination of food: control measures, 431.
Forster, R. C., and **Howard, A. G.** The capillary gas chromatography - atomic absorption spectrometry of organolead compounds, 34.
Frew, J. E., and **Green, M. J.** Amperometric biosensors, 334.
Fung, M. A., Drake, A. F., and **Simpson, C. F.** Characteristics of a novel stationary phase using protein separation as an application, 390.
—— *See* Drake, A. F.
Furst, A. *See* Akapo, S. O.

G

George, W. O. *See* Fairbrother, P.
Ghauri, F. Y. K., and **Simpson, C. F.** Chromatographic observations on porous graphitic carbon, 69.
Green, J. D. SAC 89—Cambridge. A personal recollection, 417.
Green, M. J. *See* Frew, J. E.
Greenfield, S. New Member of Council, 418.
——**, Durrani, T. M., Kaya, S.,** and **Tyson, J. F.** Preconcentration of refractory elements for inductively coupled plasma - atomic fluorescence spectrometry, 382.

H

Halsall, H. B. *See* Buckley, E.
Hansen, E. H. Report of Winter Conference on Flow Injection Analysis, 150.
Hardial, R., and **Simpson, C. F.** Dating of archaeological material by amino acid racemisation reaction using HPLC, 57.
Harriott, M., and **Thorburn Burns, D.** Ion pairing flow injection extraction, 315.
—— *See* Chimpalee, N.
—— *See* Donaghy, C.
—— *See* Thorburn Burns, D.
Hedley, G. *See* Odlyha, M.
Heineman, W. R. *See* Buckley, E.
Hemmings, P. Progress in the water industry—automation in a Water Company laboratory, 133.
Henderson, A. D. LIMS for the end user, 102.
Hill, S. *See* Branch, S.
Howard, A. G. *See* Campbell, A. T.
—— *See* Comber, S. D. W.
—— *See* Forster, R. C.

J

Jiang, M., Fielden, P. R., and **Snook, R. D.** A microwave induced detector for gas chromatography, 45.
Johnson, S., Moody, G. J., and **Thomas, J. D. R.** Design parameter studies of ion-selective field effect transistor (ISFET) sensors, 338.
Jones, P. *See* Ambrose, A. J.
Jordan, R. L. Presentation from Analytical Division, 125.

K

Kaya, S. *See* Greenfield, S.
Kelly, M. T., Dadgar, D., and **Smyth, M. R.** Some recent developments in high-performance liquid chromatography in biopharmaceutical analysis, 341.
Kennedy, J. F., Rivera, Z. S., and **White, C. A.** Carbohydrate and protein analysis of plant materials, 132.

Khong, T. M. *See* Akapo, S. O.
Kneller, P. E., Anderson, R. M., and **Tyson, J. F.** Investigation into low cost flow injection analysis, 48.
Kohnke, F. A. *See* Elmosalamy, M. A. F.
Korvala, V. M. *See* Perämäki, P.

L

Lajunen, L. H. J. *See* Perämäki, P.
Lancaster, J. S., and **Worsfold, P. J.** Flow injection determination of organosulphur compounds with chemiluminescence detection, 19.
—— and **Worsfold, P. J.** The application of chemiluminescence reactions to the analysis of industrial and environmental samples, 362.
Leonard, M. A. New Member of Council, 419.
Littlejohn, D. Appointed 1989/90 Schools Lecturer, 125.
—— Becoming absorbed and excited in atomic spectrometry. (Silver Medal Lecture), 92.
—— New Member of Council, 419.
Long, S. E. *See* Darke, S. A.
Lunec, J. Oxygen radicals: their measurement *in vivo*, 130.
Luque de Castro, M. D. *See* Valcárcel, M.

M

Macdonald, A. M. G. Awarded 19th Analytical Division Distinguished Service Award, 250.
Mama, J. E., Fell, A. F., and **Clark, B. J.** Pharmaceutical applications of porous graphitic carbon in HPLC, 71.
Marr, I. L. *See* Martin-Landa, I.
Marsden, A. B., and **Tyson, J. F.** Flow injection determination of sulphate in high ionic strength media, 157.
—— *See* Wang, X.
Marshall, G. B. Awarded 17th Analytical Division Distinguished Service Award, 125, 171.
Martin-Landa, I., de Pablos, F., and **Marr, I. L.** Determination of organotins in fish and sediments by gas chromatography with flame ionisation detection, 16.
Matthews, G. P. *See* Black, S. A.
McDowall, R. D. *See* Doyle, E.
McKervey, A. M. *See* Telting-Diaz, M.
Meaney, M., Vos, J. G., Smyth, M. R., and **Wallace, G. G.** Some analytical applications of polymer modified electrodes, 15.
Meggitt, G. C. Assessment of hazards from nuclear facilities, 161.
Metcalfe, P. J. Organolead compounds in the atmosphere, 134.
Miller, J. N. Flow injection analysis using antibodies and other receptor proteins, 317.
—— Report of Analytical Division Meeting on Flow Analysis, 149.
Momin, S. A., and **Narayanaswamy, R.** Diffuse reflectance techniques for remote chemical analysis, 372.
Moody, G. J., Saad, B. B., and **Thomas, J. D. R.** Potentiometric determination of sodium and potassium in blood serum: an assessment of the use of bis(crown ether)-based ion-selective electrodes, 8.
—— *See* Beh, S. K.
—— *See* Beswick, C. W.
—— *See* Donlan, A. M.
—— *See* Elmosalamy, M. A. F.
—— *See* Johnson, S.
Moreira, J. C., and **Fogg, A. G.** Adsorptive stripping voltammetry of some biologically important molecules, 384.
Morgan, E. D. *See* Bradley, N.
Murkitt, G. S. *See* Doyle, E.

N

Nara, O. Development of high performance pipette fillers, safe practice in handling pipettes and comparative calibrations between transfer pipettes and mechanical pipettes. (Analytical Viewpoint), 306.
Narayanaswamy, R. *See* Alabbas, S. H.
—— *See* Momin, S. A.
Ndiomu, D. P., and **Simpson, C. F.** Retention behaviour in supercritical fluid chromatography using pentane as mobile phase, 65.
—— and **Simpson, C. F.** Supercritical fluid extraction on coal tar pitch, 393.

O

Odlyha, M., Flint, C. D., and **Simpson, C. F.** The application of thermal analysis (DSC) to the study of paint media, 52.
—— **Hedley, G., Flint, C. D.,** and **Simpson, C. F.** The analysis of paint films by thermomechanical methods, 399.
O'Doherty, S. *See* Smith, C. L.
O'Neill, P. *See* Branch, S.

P

Packham, A. J., and **Fielden, P. R.** Complex sample analysis by cybernetic multi-dimensional chromatography, 336.
Peacock, C. J. New Member of Council, 419.
Penketh, G. E. New Member of Council, 85.
Perämäki, P., Korvala, V. M., and **Lajunen, L. H. J.** Use of the hydride generation technique in the determination of bismuth with a d.c. plasma atomic emission spectrometer, 255.
Pickford, C. J. *See* Darke, S. A.
Picot, V. S. *See* Doyle, E.
Pierce, T. B. Royal Society of Chemistry Awards 1988—Industrial Chemistry, 250, 305
Purnell, J. H. Appointed 1990 Theophilus Redwood Lecturer, 125.

R

Rendell, D. A. E. *See* Dicken, T. W.
Rezgui, N., and **Alder, J. F.** An RF oscillator for 158 MHz surface acoustic wave sensors (SAWS), 46.
Rivera, Z. S. *See* Kennedy, J. F.
Roberts, D. J. *See* Smith, C. L.
Robinson, M. L. *See* Dyas, A. M.
Rocks, B. F. Flow injection analysers for clinical use, 321.
Rogers, S. J. *See* Doyle, E.

S

Saad, B. B. *See* Moody, G. J.
Sanagi, M. M., and **Smith, R. M.** Selectivity studies in supercritical fluid chromatography, 22.
Schubert, A. *See* Braun, T.
Scullion, S. P. *See* Zhao, R.
Seward, E. M. *See* Telting-Diaz, M.
Shallis, P. W. Presentation from Analytical Division, 125.

Shen, J., and **Snook, R. D.** The determination of quantum efficiencies of laser dye using the thermal lens effect, 27.
—— and **Snook, R. D.** Two-beam thermal lens spectrometer for ultra-trace analysis, 403.
Shurvell, H. F. *See* Bergin, F. J.
Silk, N. A. Contaminants, taints and off-flavours in beer, 428.
Simpson, C. F. *See* Akapo, S. O.
—— *See* Drake, A. F.
—— *see* Fung, M. A.
—— *See* Ghauri, F. Y. K.
—— *See* Hardial, R.
—— *See* Ndiomu, D. P.
—— *See* Odlyha, M.
Simpson, D. New Member of Council, 420.
Slater, J. M. Membrane design and photocuring encapsulation of flatpack based ion-sensitive field effect transistors. (Ronald Belcher Memorial Lecture), 96.
—— *See* Barretto, F. F.
—— and **Watt, E. J.** Use of the conducting polymer, polypyrrole, as a sensor, 397.
Smith, C. L., O'Doherty, S., Cooke, M., and **Roberts, D. J.** Determination of nicotine metabolites by HPLC after complexation with diethylthiobarbituric acid, 348.
Smith, I. J. Hewlett-Packard's LABSAM in an integrated system, 103.
Smith, R. M. *See* Burford, M. D.
—— *See* Burr, C. M.
—— *See* Sanagi, M. M.
Smyth, M. R. *See* Buckley, E.
—— *See* Dominguez, P.
—— *See* Kelly, M. T.
—— *See* Meaney, M.
—— *See* Telting-Diaz, M.
Snook, R. D. *See* Jiang, M.
—— *See* Shen, J.
—— Receives 16th SAC Silver Medal, 171.
Snowdon, P. J. LIMS in the pesticide residue laboratory, 100.
Stahl, E. Presentation of fourth Robert Boyle Gold Medal (posthumous), 86.
Stevens, P. J. New Member of Council, 85.
Stoddart, J. F. *See* Eimosalamy, M. A. F.
Svehla, G. *See* Brennan, M. C.
—— *See* Telting-Diaz, M.
Sweeting, F. W. *See* Benson, R. L.

T

Taylor, A. Sample preparation procedures used in clinical chemistry, 293.
Telting-Diaz, M., Smyth, M. R., Diamond, D., Seward, E. M., Svehla, G., and **McKervey, A. M.** Analysis of sodium in blood plasma using a new mini ion-selective electrode, 29.
Thomas, J. D. R. Polyethers as potentiometric sensors, 331.
—— The measurement of free radical activity. (Editorial), 361.
—— *See* Baiulescu, G. E.
—— *See* Beh, S. K.
—— *See* Beswick, C. W.
—— *See* Donlan, A. M.
—— *See* Elmosalamy, M. A. F.
—— *See* Johnson, S.
—— *See* Moody, G. J.
Thompson, J. M. Evaluation of ion-selective field effect transistors for the measurement of ions in whole blood, 126.
Thorburn Burns, D. SAC 89—A message from the President of the Division, 177.
——, **Chimpalee, D.,** and **Chimpalee, N.** Spectrophotometric determination of manganese in steel after solid-phase extraction of trimethylenebis(triphenylphosphonium) permanganate with microcrystalline naphthalene, 11.
——, **Chimpalee, N.,** and **Harriott, M.** Development of a flow injection manifold for the extraction of the perchlorate ion with Brilliant Green, 4.
—— *See* Chimpalee, N.
—— *See* Donaghy, C.
—— *See* Harriott, M.
Tice, P. A. Detection of migration from packaging materials, 429.
Townshend, A. *See* Almuiabed, A. M.
—— *See* Andrews, A. R. J.
Tuñon, P. *See* Dominguez, P.
Tyson, J. F. Awarded 18th Analytical Division Distinguished Service Award, 125, 171.
—— Modern analytical chemistry. (Analytical Viewpoint), 251.
—— Spectroscopy's answer to the Nernst equation, 318.
—— *See* Adeeyinwo, C. E.
—— *See* Darke, S. A.
—— *See* Greenfield, S.
—— *See* Kneller, P. E.
—— *See* Marsden, A. B.
—— *See* Wang, X.

U

Ure, A. M. Awarded 20th Analytical Division Distinguished Service Award, 250.
Usher, M. *See* Angelikaki, C.

V

Valcárcel, M., and **Luque de Castro, M. D.** Recent advances in detection in flow injection systems, 313.
van der Linden, W. E., Bos, M., and **Bos, A.** Arrays of electrodes for multi-component analysis, 329.
Vos, J. G. *See* Meaney, M.

W

Wagland, A. A. Current and future impact of LIMS in quality control, 99.
Walker, D. A. *See* Aylott, R. I.
Wallace, G. G. *See* Meaney, M.
Wang, X., Marsden, A. B., Fogg, A. G., and **Tyson, J. F.** Design of manifolds for flow injection solution spectrophotometry, 51.
Warren, J. M. New Member of Council, 420.
Watson, C. A. Analytical Division Subject Groups, 122.
Watt, E. J. *See* Slater, J. M.
Wentzell, P. D. New approaches to reaction-rate methods of analysis, 128.
West, T. S. Elected to the Fellowship of the Royal Society, 250.
Weston, P. C. New Member of Council, 420.
White, C. A. *See* Kennedy, J. F.
Williams, D. R. Obituary of J. Aggett, 150.
—— Modelling of radioactivity in the environment—from now to eternity?, 162.

Williams, J. G. Awarded Hilger Spectroscopy Prize 1988, 86.
Williams, J. M. *See* Fairbrother, P.
Wilson, I. D. Awarded 17th SAC Silver Medal, 250.
Woodget, B. W. SAC 89. (Editorial), 177.
—— Sampling and standards, 283.
Worsfold, P. J. Awarded 18th SAC Silver Medal, 250.
—— New Member of Council, 421.
—— Process analysis and information management. (Editorial), 1.
—— *See* Benson, R. L.
—— *See* Lancaster, J. S.

Y

Young, R. A. A brief history of Cambridge, 179.

Z

Zhao, R., Scullion, S. P., and **Fogg, A. G.** Modification of a glassy carbon electrode by electrochemical deposition of reduced 12-molybdophosphate in a flow injection system: increased response to molybdate and pH, 363.
Zsindely, S. *See* Braun, T.

SUBJECT INDEX

A

Adsorptive stripping voltammetry: *See* Voltammetry.
Anaerobic sealants: *See* Sealants, anaerobic.
Analyst Editorial Advisory Board: Award to Professor A. M. Bond, 439.
Analytical chemistry: Concepts in analytical chemistry. Baiulescu and Thomas, 281.
Modern analytical chemistry (Analytical Viewpoint). Tyson, 251.
The decline of British analytical chemistry: fact or artifact? (Analytical Viewpoint). Braun, Schubert and Zsindely, 87.
Analytical Chemistry Trust: 422.
Analytical Chemistry Trust Fund (Rules): 422.
Analytical Division: *See also* SAC 89.
17th AGM, 149.
Analytical Division subject groups. Watson, 122
Atomic Spectroscopy Group. 24th AGM, 121.
Atomic Spectroscopy Group—Review, 123.
Automatic Methods Group. 23rd AGM, 121.
Biological Methods Group—Review, 122.
Chromatography and Electrophoresis Group. 24th AGM, 121.
Distinguished Service Award, 17th. Conferred on G. B. Marshall, 125, 171.
Distinguished Service Award, 18th. Conferred on J. F. Tyson, 125, 171.
Distinguished Service Award, 19th. Conferred on A. M. G. Macdonald, 250.
Distinguished Service Award, 20th. Conferred on A. M. Ure, 250.
East Anglia Region. 21st AGM, 121.
Electroanalytical Group. 19th AGM, 122.
Joint Pharmaceutical Analysis Group. 19th AGM, 249.
Micro and Chemical Methods Group. 45th AGM, 121.
Micro and Chemical Methods Group—Review, 123.
Molecular Spectroscopy Group. 2nd AGM, 122.
New members of Council, 85, 418.
North East Region. 23rd AGM, 121.
North West Region. 64th AGM, 361.
Particle Characterisation Group. 23rd AGM, 122.
Radiochemical Methods Group. 22nd AGM, 122.
Robert Boyle Medal, 4th. Presented to the widow of E. Stahl, 86.
Schools Lecturer 1989/90. D. Littlejohn, 125.
Schools Lecturer 1990/91. D. Betteridge, 250.
Scottish Region. 54th AGM, 121.
Silver Medal, 16th. Presented to R. D. Snook, 171.
Silver Medal, 17th. Awarded to I. D. Wilson, 250.
Silver Medal, 18th. Awarded to P. J. Worsfold, 250.
South East Region. 14th AGM, 121.
L. S. Theobald Lecturer. J. A. W. Dalziel, 250.
Theophilus Redwood Lecturer. J. H. Purnell, 125.
Thermal Methods Group. 24th AGM, 121.
Analytical Viewpoints: 87, 251, 306, 424.
Antibodies: Flow injection analysis using antibodies and other receptor proteins. Miller, 317.
Antimony: A semi-continuous flow method for the trace analysis of dissolved inorganic antimony. Campbell and Howard, 32.
Arrays, voltammetric: *See* Voltammetry.
Arsenic: Arsenic speciation by hydride generation atomic absorption spectrometry and its application to the study of biological cycling in the coastal environment. Comber and Howard, 20.
The determination of arsenic species by coupled high-performance liquid chromatography - atomic spectrometry. Branch, Bancroft, Ebdon and O'Neill, 73.
Atomic absorption spectrometry: *See* Spectrometry, atomic absorption.
Atomic emission spectrometry: *See* Spectrometry, atomic emission.
Automation: Automated sample handling for drug analysis from biological fluids using HPLC. Doyle, McDowall, Murkitt, Picot and Rogers, 294.
Progress in the water industry—automation in a water company laboratory. Hemmings, 133.

B

Beer: Contaminants, taints and off-flavours in beer. Silk, 428.
Benzodiazepines: Chemiluminescence detection of a benzodiazepine. Andrews and Townshend, 368.
Beverages, contamination: Contaminants, taints and off-flavours in beer. Silk, 428.
Determination of ethyl carbamate in alcoholic beverages. Aylott and Walker, 431.
Biological fluids: Automated sample handling for drug analysis from biological fluids using HPLC. Doyle, McDowall, Murkitt, Picot and Rogers, 294.
Biopharmaceutical analysis: Some recent developments in high-performance liquid chromatography in biopharmaceutical analysis. Kelly, Dadgar and Smyth, 341.
Bis(tributyltin) oxide: Use of surface coatings in the determination of bis(tributyltin) oxide in freshwater by using graphite furnace atomic absorption spectrometry. Donaghy, Harriott and Thorburn Burns, 260.
Bismuth: Improvement in the determination of bismuth by flame atomic absorption spectrometry using a new design of slotted tube atom trap. Chimpalee, Harriott and Thorburn Burns, 258.
Use of the hydride generation technique in the determination of bismuth with a d.c. plasma atomic emission spectrometer. Perämäki, Korvala and Lajunen, 255.
Blood plasma: Analysis of sodium in blood plasma using a new mini ion-selective electrode. Telting-Diaz, Smyth, Diamond, Seward, Svehla and McKervey, 29.
Blood serum: Lithium ion-selective electrodes: optimisation studies for blood serum analysis. Beswick, Moody and Thomas, 2.
Potentiometric determination of sodium and potassium in blood serum: an assessment of the use of bis(crown ether)-based ion-selective electrodes. Moody, Saad and Thomas, 8.
Blood, whole: Evaluation of ion-selective field effect transistors for the measurement of ions in whole blood. Thompson, 126.

C

Calorimetry, differential scanning (DSC): *See* Differential scanning calorimetry.
Carbohydrates: Carbohydrate and protein analysis of plant materials. Kennedy, Rivera and White, 132.
Carbon, porous graphitic: Chromatographic observations on porous graphitic carbon. Ghauri and Simpson, 69.
Pharmaceutical applications of porous graphitic carbon in HPLC. Mama, Fell and Clark, 71.

Cheese: Fermentation of cheese whey—monitoring by FT - IR. Fairbrother, George and Williams, 264.
Chemiluminescence: Chemiluminescence detection of a benzodiazepine. Andrews and Townshend, 368.
The application of chemiluminescence reactions to the analysis of industrial and environmental samples. Lancaster and Worsfold, 362.
Chemometrics: Fourier transforms in spectroscopy—a chemometric approach. Brereton, 311.
Chemotaxonomy: Chemotaxonomic identification of *Tanacetum parthenium* L. (Feverfew). Burford and Smith, 339.
Chromatography, gas: A microwave induced plasma detector for gas chromatography. Jiang, Fielden and Snook, 45.
Colorimetric and gas chromatographic determination of fluoride in toothpastes containing ionic and covalent fluoride. Black and Matthews, 67.
Determination of organotins in fish and sediments by gas chromatography with flame photometric detection. Martin-Landa, de Pablos and Marr, 16.
The capillary gas chromatography - atomic absorption spectrometry of organotin and organolead compounds. Forster and Howard, 34.
Chromatography, HPLC: Automated sample handling for drug analysis from biological fluids using HPLC. Doyle, McDowall, Murkitt, Picot and Rogers, 294.
Characteristics of a novel stationary phase using protein separation as an application. Fung, Drake and Simpson, 390.
Chromatographic observations on porous graphitic carbon. Ghauri and Simpson, 69.
Complex sample analysis by cybernetic multi-dimensional chromatography. Packham and Fielden, 336.
Dating of archaeological material by amino acid racemisation reaction using HPLC. Hardial and Simpson, 57.
Determination of nicotine metabolites by HPLC after complexation with diethylthiobarbituric acid. Smith, O'Doherty, Cooke and Roberts, 348.
Effect of carbon load on the chromatographic performance of n-octylsilyl reversed phases in liquid chromatography. Akapo, Furst, Khong and Simpson, 61.
Influence of mobile phase additives on the retention behaviour of polar solutes on oligomeric n-octylsilyl reversed phases. Akapo and Simpson, 394.
Liquid chromatography - inductively coupled plasma - mass spectrometry for monitoring tributyltin in waters. Branch, Ebdon, Hill and O'Neill, 401.
New approaches to chiral resolution of drug enantiomers and related compounds by HPLC. Dyas, Robinson and Fell, 346.
Pharmaceutical applications of porous graphitic carbon in HPLC. Mama, Fell and Clark, 71.
Retention prediction in RP-HPLC using a functional group database and expert system (CRIPES). Burr and Smith, 24.
Some recent developments in high-performance liquid chromatography in biopharmaceutical analysis. Kelly, Dadgar and Smyth, 341.
The determination of arsenic species by coupled high-performance liquid chromatography - atomic spectrometry. Branch, Bancroft, Ebdon and O'Neill, 73.
Chromatography, reversed phase: Protein conformational changes as the result of binding to reversed phase chromatography column materials. Drake, Fung and Simpson, 49.
Chromatography, supercritical fluid: Retention behaviour in supercritical fluid chromatography using pentane as mobile phase. Ndiomu and Simpson, 65.
Selectivity studies in supercritical fluid chromatography. Sanagi and Smith, 22.
Supercritical fluid extraction on coal tar pitch. Ndiomu and Simpson, 393.
Clinical chemistry: Flow injection analysers for clinical use. Rocks, 321.
Sample preparation procedures used in clinical chemistry. Taylor, 293.
Coal tar pitch: Supercritical fluid extraction on coal tar pitch. Ndiomu and Simpson, 393.
Colorimetry: Colorimetric and gas chromatographic determination of total fluoride in toothpastes containing ionic and covalent fluoride. Black and Matthews, 67.
CRIPES: *See* Expert system.

D

Database: Retention prediction in RP-HPLC using a functional group database and expert system (CRIPES). Burr and Smith, 24.
Diacetyl peroxide: Iodimetric method for measuring low concentrations of diactyl peroxide, using hydrogen peroxide as a catalyst. Davies and Deary, 366.
Differential scanning calorimetry: The application of thermal analysis (DSC) to the study of paint media. Odlyha, Flint and Simpson, 52.
Drugs: Automated sample handling for drug analysis from biological fluids using HPLC. Doyle, McDowall, Murkitt, Picot and Rogers, 294.
New approaches to chiral resolution of drug enantiomers and related compounds by HPLC. Dyas, Robinson and Fell, 346.

E

Editorials: 1, 177, 361.
Effluents: New strategies for determining trace metals in industrial materials and effluents. Bond, 289.
Electroanalysis: Amperometric biosensors. Frew and Green, 334.
Arrays of electrodes for multi-component analysis. van der Linden, Bos and Bos, 329.
Polyethers as potentiometric sensors. Thomas, 331.
Some analytical applications of polymer modified electrodes. Meaney, Vos, Smyth and Wallace, 15.
Electrochemical immunoassay: *See* Immunoassay.
Electrochemical sensors: *See* Sensors.
Electrode, enzyme: *See* Enzyme electrode.
Electrode, glassy carbon: *See* Glassy carbon electrode.
Electrode, ion selective: *See* Ion-selective electrode.
Electrothermal vaporisation: Study of electrothermal vaporisation sample introduction for plasma spectrometry. Darke, Pickford and Tyson, 379.
Environmental analysis: *See also* Pollutants.
Arsenic speciation by hydride generation atomic absorption spectrometry and its application to the study of biological cycling in the coastal environment. Comber and Howard, 20.
Assessment of hazards from nuclear facilities. Meggitt, 161.
Liquid chromatography - inductively coupled plasma - mass spectrometry for monitoring tributyltin in waters. Branch, Ebdon, Hill and O'Neill, 401.
Modelling of radioactivity in the environment—from now to eternity? Williams, 162.
Organolead compounds in the atmosphere. Metcalfe, 134.
The application of chemiluminescence reactions to the analysis of industrial and environmental samples. Lancaster and Worsfold, 362.
Use of surface coatings in the determination of bis(tributyltin) oxide in freshwater by using graphite furnace atomic absorption spectrometry. Donaghy, Harriott and Thorburn Burns, 260.

Enzyme electrode: ISFET-based enzyme sensors for urea: enzyme modified ISFETs and column-immobilised enzyme flow injection analysis. Chandler, Dodgson and Eddowes, 154.
Modified simplex optimisation for operating an enzyme electrode. Beh, Moody and Thomas, 290.
Sensors based on amperometric enzyme electrodes. Dominguez, Tuñon, Fernandez and Smyth, 387.
The amperometric detection of some enzyme inhibitors. Donlan, Moody and Thomas, 369.
Enzymes: Enzymatic amplification reactions: flow injection determination of NAD^+ with immobilised alcohol dehydrogenase and malate dehydrogenase. Almuiabed and Townshend, 56.
Equipment news: 37, 76, 113, 137, 165, 268, 296, 323, 353, 409, 434.
Ethyl carbamate: Determination of ethyl carbamate in alcoholic beverages. Aylott and Walker, 431.
Expert system: Retention prediction in RP-HPLC using a functional group database and expert system (CRIPES). Burr and Smith, 24.

F

Feverfew: Chemotaxonomic identification of *Tanacetum parthenium* L. (Feverfew). Burford and Smith, 339.
Flow injection: Design of manifolds for flow injection solution spectrophotometry. Wang, Marsden, Fogg and Tyson, 51.
Development of a flow injection manifold for the extraction of the perchlorate ion with Brilliant Green. Thorburn Burns, Chimpalee and Harriott, 4.
Enzymatic amplification reactions: flow injection determination of NAD^+ with immobilised alcohol dehydrogenase and malate dehydrogenase. Almuiabed and Townshend, 56.
Flow injection analysers for clinical use. Rocks, 321.
Flow injection analysis using antibodies and other receptor proteins. Miller, 317.
Flow injection determination of organosulphur compounds with chemiluminescence detection. Lancaster and Worsfold, 19.
Flow injection determination of sulphate in high ionic strength media. Marsden and Tyson, 157.
Investigation into low cost flow injection analysis. Kneller, Anderson and Tyson, 48.
Ion pairing flow injection extraction. Harriott and Thorburn Burns, 315.
ISFET-based enzyme sensors for urea: enzyme-modified ISFETs and column-immobilised enzyme flow injection analysis. Chandler, Dodgson and Eddowes, 154.
Modification of a glassy carbon electrode by electrochemical deposition of reduced 12-molybdophosphate in a flow injection system: increased response to molybdate and pH. Zhao, Scullion and Fogg, 363.
On-line precipitation in flow injection atomic absorption spectrometry. Adeeyinwo and Tyson, 375.
Recent advances in detection in flow injection systems. Valcárcel and Luque de Castro, 313.
Reduction of interference effects in flame atomic absorption spectrometry using flow injection techniques. Adeeyinwo and Tyson, 58.
Spectrophotometric flow-injection techniques for process monitoring. Benson, Worsfold and Sweeting, 385.
Spectroscopy's answer to the Nernst equation. Tyson, 318.
Flow method: A semi-continuous flow method for the trace analysis of dissolved inorganic antimony. Campbell and Howard, 32.
Fluids, lubricating: Determination of oil additives by infrared spectroscopy. Dicken and Rendell, 405.
Fluoride: Colorimetric and gas chromatographic determination of total fluoride in toothpastes containing ionic and covalent fluoride. Black and Matthews, 67.
Food, contamination: Detection of migration from packaging materials. Tice, 429.
Microbial contamination of food: control measures. Forbes, 431.
Free radicals: The measurement of free radical activity. (Editorial.) Thomas, 361.

G

Gas chromatography: *See* Chromatography, gas.
Glassy carbon electrode: Modification of a glassy carbon electrode by electrochemical deposition of reduced 12-molybdophosphate in a flow injection system: increased response to molybdate and pH. Zhao, Scullion and Fogg, 363.

H

High-performance liquid chromatography: *See* Chromatography, HPLC.
Hilger Spectroscopy Prize: Presented to J. G. Williams, 86.
Hydride generation: Use of the hydride generation technique in the determination of bismuth with a d.c. plasma atomic emission spectrometer. Perämäki, Korvala and Lajunen, 255.
Hydrogen peroxide: Iodimetric method for measuring low concentrations of diacetyl peroxide, using hydrogen peroxide as a catalyst. Davies and Deary, 366.

I

Immunoassay: Some recent developments in electrochemical immunoassays. Buckley, Smyth, Heineman and Halsall, 5.
Immunosensors: Immunosensors based upon direct measurements of surface binding: fundamental chemical limitations. Eddowes, 152.
Inductively coupled plasma: Study of electrothermal vaporisation sample introduction for plasma spectrometry. Darke, Pickford and Tyson, 379.
Inductively coupled plasma atomic fluorescence spectrometry: Preconcentration of refractory elements for inductively coupled plasma atomic fluorescence spectrometry. Greenfield, Durrani, Kaya and Tyson, 382.
Inductively coupled plasma optical emission spectrometry: Laser ablation system for solid sample introduction into the inductively coupled plasma. Darke, Long, Pickford and Tyson, 159.
Inductively coupled plasma mass spectrometry: Laser ablation system for solid sample introduction into the inductively coupled plasma. Darke, Long, Pickford and Tyson, 159.
Liquid chromatography - inductively coupled plasma - mass spectrometry for monitoring tributyltin in waters. Branch, Ebdon, Hill and O'Neill, 401.
Information management: Process control and information management. (Editorial.) Worsfold, 1.
Infrared spectroscopy: *See* Spectrometry, infrared.
Iodimetry: Iodimetric method for measuring low concentrations of diacetyl peroxide, using hydrogen peroxide as a catalyst. Davies and Deary, 366.
Ion-selective electrode: Analysis of sodium in blood plasma using a new mini ion-selective electrode. Telting-Diaz, Smyth, Diamond, Seward, Svehla and McKervey, 29.
Lithium ion-selective electrodes: optimisation studies for blood serum analysis. Beswick, Moody and Thomas, 2.
Potentiometric determination of sodium and potassium in blood serum: an assessment of the use of bis(crown ether)-based ion-selective electrodes. Moody, Saad and Thomas, 8.

Ion-sensitive field effect transistors: Design parameter studies of ion-selective field effect transistor (ISFET) sensors. Johnson, Moody and Thomas, 338.
Evaluation of ion-selective field effect transistors for the measurement of ions in whole blood. Thompson, 126.
ISFET-based enzyme sensors for urea: enzyme-modified ISFETs and column-immobilised enzyme flow injection analysis. Chandler, Dodgson and Eddowes, 154.
Membrane design and photocuring encapsulation of flatpack based ion-sensitive field effect transistors. Slater, 96.
ISFETs: *See* Ion-sensitive field effect transistors.
IUPAC recommendations: 142.

L

Laboratory information management systems: Current and future impact of LIMS in quality control. Wagland, 99.
Hewlett-Packard's LABSAM in an integrated system. Smith, 103.
Justify a LIMS system. Davison, 102.
LIMS for the end user. Henderson, 102.
LIMS in the pesticide residue laboratory. Snowdon, 100.
Laser ablation: Laser ablation system for solid sample introduction into the inductively coupled plasma. Darke, Long, Pickford and Tyson, 159.
LIMS: *See* Laboratory information management systems.

M

Manganese: Spectrophotometric determination of manganese in steel after solid-phase extraction of trimethylenebis(triphenylphosphonium) permanganate with microcrystalline naphthalene. Thorburn Burns, Chimpalee and Chimpalee, 11.
Multi-dimensional chromatography: *See* Chromatography, HPLC.

N

Nicotine: Determination of nicotine metabolites by HPLC after complexation with diethylthiobarbituric acid. Smith, O'Doherty, Cooke and Roberts, 348.
Nobel Prize, for medicine: Presented to Sir James Black FRS, 78.

O

Obituary: 75, 150.
Optimisation: Lithium ion-selective electrodes: optimisation studies for blood serum analysis. Beswick, Moody and Thomas, 2.
Modified simplex optimisation for operating an enzyme electrode. Beh, Moody and Thomas, 290.
Simplex optimisation. Burton, 285.
Organolead compounds: Organolead compounds in the atmosphere. Metcalfe, 134.
The capillary gas chromatography - atomic absorption spectrometry of organotin and organolead compounds. Forster and Howard, 34.
Organosulphur compounds: Flow injection determination of organosulphur compounds with chemiluminescence detection. Lancaster and Worsfold, 19.
Organotin compounds: Determination of organotins in fish and sediments by gas chromatography with flame photometric detection. Martin-Landa, de Pablos and Marr, 16.
The capillary gas chromatography - atomic absorption spectrometry of organotin and organolead compounds. Forster and Howard, 34.
Oscillator, RF: An RF oscillator for 158 MHz surface acoustic wave sensors (SAWS). Rezgui and Alder, 46.
Oxygen, radicals: Oxygen radicals: their measurement *in vivo*. Lunec, 130.

P

Packaging materials: Detection of migration from packaging materials. Tice, 429.
Paint: The analysis of paint by thermomechanical methods. Odlyha, Hedley, Flint and Simpson, 399.
Piezoelectric crystals: Studies on two epoxyoctacosahydro[12]cyclacene derivatives as sensor coatings on quartz piezoelectric crystals for detecting aromatic vapours. Elmosalamy, Moody, Thomas, Kohnke and Stoddart, 12.
Pipettes: Development of high performance pipette fillers, safe practice in handling pipettes and comparative calibrations between transfer pipettes and mechanical pipettes. (Analytical Viewpoint.) Nara, 306.
Plant materials: Carbohydrate and protein analysis of plant materials. Kennedy, Rivera and White, 132.
Pollutants: Strategies for sampling ambient air for pollutants of industrial and environmental interest. Clayton and Davis, 284.
Polyethers: Polyethers as potentiometric sensors. Thomas, 331.
Polymer, conducting: *See* Polypyrrole.
Polypyrrole: Use of the conducting polymer, polypyrrole, as a sensor. Slater and Watt, 397.
Potassium: Potentiometric determination of sodium and potassium in blood serum: an assessment of the use of bis(crown ether)-based ion-selective electrodes. Moody, Saad and Thomas, 8.
Preconcentration technique: Novel preconcentration technique for the determination of trace elements in fine chemicals. Ambrose, Ebdon and Jones, 377.
Preconcentration of refractory elements for inductively coupled plasma - atomic fluorescence spectrometry. Greenfield, Durrani, Kaya and Tyson, 382.
Process analysis: Process analysis and information management. (Editorial.) Worsfold, 1.
Process monitoring: Spectrophotometric flow-injection techniques for process monitoring. Benson, Worsfold and Sweeting, 385.
Proteins: Carbohydrate and protein analysis of plant materials. Kennedy, Rivera and White, 132.
Characteristics of a novel stationary phase using protein separation as an application. Fung, Drake and Simpson, 390.
Flow injection analysis using antibodies and other receptor proteins. Miller, 317.
Protein conformational changes as the result of binding to reversed phase chromatography column materials. Drake, Fung and Simpson, 49.
Publications received: 170, 299, 358.

Q

Quality control: Current and future impact of LIMS in quality control. Wagland, 99.
Quantum efficiency: The determination of quantum efficiencies of laser dye using the thermal lens effect. Shen and Snook, 27.

R

Radioactivity: Modelling of radioactivity in the environment—from now to eternity? Williams, 162.

Raman spectroscopy: *See* Spectroscopy, Raman.
Reaction-rate methods: New approaches to reaction-rate methods of analysis. Wentzell, 128.
Reflectance techniques: Design and performance features of an optical-fibre reflectance pH sensor. Alabbas, Ashworth and Narayanaswamy, 373.
Diffuse reflectance techniques for remote chemical analysis. Momin and Narayanaswamy, 372.
Reports of meetings: Flow analysis—London. Miller, 159.
Flow injection analysis—Orlando, Florida. Hansen, 150.
Training of Analytical Chemists for Developing Countries—Salford. Bark, 249.
Ronald Belcher Memorial Lecture: J. M. Slater, 96.
Royal Society: T. S. West, CBE, elected to Fellowship, 250.
Royal Society of Chemistry Awards 1988: Chromatography and separation chemistry—A. F. Fell, 250, 305.
Industrial analysis—T. B. Pierce, 250, 305.

S

SAC 89: *N.b.* Pages 177–246 were entirely devoted to the SAC 89 Conference.
A brief history of Cambridge. R. A. Young, 179.
A message from the President of the Division. D. Thorburn Burns, 177.
Cambridge. A personal recollection. J. D. Green, 417.
Conference committee, 178.
Editorial. B. W. Woodget, 177.
Exhibition, 246.
Industrial Visits, 183.
Opening Ceremony, 184.
Plenary lecturers, 180.
Scientific programme, 106, 185.
Social Programme, 182.
Synopses of papers, 199.
Synopses of posters, 223.
Update courses, 141, 196.
Workshops, 196.
Sample preparation: Automated sample handling for drug analysis from biological fluids using HPLC. Doyle, McDowall, Murkitt, Picot and Rogers, 294.
Sample preparation procedures used in clinical chemistry. Taylor, 293.
Sampling: An intelligent sample changer. (Analytical Viewpoint.) Angelikaki and Usher, 424.
Sampling and analysis of organic vapours in the flue gases from pottery kilns. Bradley and Morgan, 6.
Sampling and standards. Woodget, 283.
Strategies for sampling ambient air for pollutants of industrial and environmental interest. Clayton and Davis, 284.
Sealants, anaerobic: Voltammetric methods in the analysis of anaerobic sealants. Brennan and Svehla, 343.
Sensors: Amperometric biosensors. Frew and Green, 334.
An RF oscillator for 158 MHz surface acoustic wave sensors (SAWS). Rezgui and Alder, 46.
Design and performance features of an optical-fibre reflectance pH sensor. Alabbas, Ashworth and Narayanaswamy, 373.
Immunosensors based upon direct measurements of surface binding: fundamental chemical limitations. Eddowes, 152.
Polyethers as potentiometric sensors. Thomas, 331.
Sensors based on amperometric enzyme electrodes. Dominguez, Tuñon, Fernandez and Smyth, 387.
Studies on two epoxyoctacosahydro[12]cyclacene derivatives as sensor coatings on quartz piezoelectric crystals for detecting aromatic vapours. Elmosalamy, Moody, Thomas, Kohnke and Stoddart, 12.
Use of the conducting polymer, polypyrrole, as a sensor. Slater and Watt, 397.
Serum, blood: *See* Blood serum.
Society for Analytical Chemistry: *See* SAC 89.
Sodium: Analysis of sodium in blood plasma using a new mini ion-selective electrode. Telting-Diaz, Smyth, Diamond, Seward, Svehla and McKervey, 29.
Potentiometric determination of sodium and potassium in blood serum: an assessment of the use of bis(crown ether)-based ion-selective electrodes. Moody, Saad and Thomas, 8.
Spectrometry, atomic absorption: Arsenic speciation by hydride generation atomic absorption spectrometry and its application to the study of biological cycling in the coastal environment. Comber and Howard, 20.
Becoming absorbed and excited in atomic spectrometry. (Silver Medal Lecture.) D. Littlejohn, 92.
Improvement in the determination of bismuth by flame atomic absorption spectrometry using a new design of slotted tube atom trap. Chimpalee, Harriott and Thorburn Burns, 258.
On-line precipitation in flow injection atomic absorption spectrometry. Adeeyinwo and Tyson, 375.
Reduction of interference effects in flame atomic absorption spectrometry using flow injection techniques. Adeeyinwo and Tyson, 58.
The capillary gas chromatography - atomic absorption spectrometry of organotin and organolead compounds. Forster and Howard, 34.
The determination of arsenic species by coupled high-performance liquid chromatography - atomic spectrometry. Branch, Bancroft, Ebdon and O'Neill, 73.
Use of surface coatings in the determination of bis(tributyltin) oxide in freshwater by using graphite furnace atomic absorption spectrometry. Donaghy, Harriott and Thorburn Burns, 260.
Spectrometry, atomic emission: Use of the hydride generation technique in the determination of bismuth with a d.c. plasma atomic emission spectrometer. Perämäki, Korvala and Lajunen, 255.
Spectrometry, infrared: Determination of oil additives by infrared spectroscopy. Dicken and Rendell, 405.
Fermentation of cheese whey—monitoring by FT - IR. Fairbrother, George and Williams, 264.
Spectrometry, thermal lens: Two-beam thermal lens spectrometer for ultra-trace analysis. Shen and Snook, 403.
Spectrophotometry: Design of manifolds for flow injection solution spectrophotometry. Wang, Marsden, Fogg and Tyson, 51.
Spectrophotometric determination of manganese in steel after solid-phase extraction of trimethylenebis(triphenylphosphonium) permanganate with microcrystalline naphthalene. Thorburn Burns, Chimpalee and Chimpalee, 11.
Spectrophotometric flow-injection techniques for process monitoring. Benson, Worsfold and Sweeting, 385.
Spectroscopy, infrared: *See* Spectrometry, infrared.
Spectroscopy, molecular: Fourier transforms in spectroscopy—a chemometric approach. Brereton, 311.
Spectroscopy, Raman: Applications and limitations of Fourier transform Raman spectroscopy. Bergin and Shurvell, 263.
Standards: Sampling and standards. Woodget, 283.
Sulphate: Flow injection determination of sulphate in high ionic strength media. Marsden and Tyson, 157.
Supercritical fluid chromatography: *See* Chromatography, supercritical fluid.

T

***Tanacetum parthenium* L.:** *See* Feverfew.
Thermal analysis: The application of thermal analysis (DSC) to the study of paint media. Odlyha, Flint and Simpson, 52.
Thermal lens spectrometer: *See* Spectrometry, thermal lens.

Thermomechanical analysis: The analysis of paint films by thermomechanical methods. Odlyha, Hedley, Flint and Simpson, 399.

Trace elements: Novel preconcentration technique for the determination of trace elements in fine chemicals. Ambrose, Ebdon and Jones, 377.

Trace metals: New strategies for determining trace metals in industrial materials and effluents. Bond, 289.

Transistors, ion-sensitive field effect: *See* Ion-sensitive field effect transistors.

Tributyltin: Liquid chromatography - inductively coupled plasma - mass spectrometry for monitoring tributyltin in waters. Branch, Ebdon, Hill and O'Neill, 401.

Use of surface coatings in the determination of bis(tributyltin) oxide in freshwater by using graphite furnace atomic absorption spectrometry. Donaghy, Harriott and Thorburn Burns, 260.

U

Urea: ISFET-based enzyme sensors for urea: enzyme-modified ISFETs and column-immobilised enzyme flow injection analysis. Chandler, Dodgson and Eddowes, 154.

V

Vaporisation, electrothermal: *See* Electrothermal vaporisation.

Vapours, aromatic: Studies on two epoxyoctacosahydro-[12]cyclacene derivatives as sensor coatings on quartz piezoelectric crystals for detecting aromatic vapours. Elmosalamy, Moody, Thomas, Kohnke and Stoddart, 12.

Vapours, organic: Sampling and analysis of organic vapours in the flue gases from pottery kilns. Bradley and Morgan, 6.

Voltammetry: Adsorptive stripping voltammetry of some biologically important molecules. Moreira and Fogg, 384.

Safety in numbers: detection with voltammetric arrays. Brearley, Doshi and Fielden, 389.

Voltammetric methods in the analysis of anaerobic sealants. Brennan and Svehla, 343.

W

Water: Liquid chromatography - inductively coupled plasma - mass spectrometry for monitoring tributyltin in waters. Branch, Ebdon, Hill and O'Neill, 401.

Progress in the water industry—automation in a water company laboratory. Hemmings, 133.

Use of surface coatings in the determination of bis(tributyltin) oxide in freshwater by using graphite furnace atomic absorption spectrometry. Donaghy, Harriott and Thorburn Burns, 260.

Typeset and printed by Black Bear Press Limited, Cambridge, England